

A Step into the Anarchist's Mind:
Examining Political Attitudes and Ideology through Event-Related Brain Potentials

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Abstract

The present study investigates patterns of event-related brain potentials (ERPs) following the presentation of attitudinal stimuli among political moderates ($N = 12$) and anarchists ($N = 11$). We used a modified oddball paradigm to investigate the evaluative inconsistency effect elicited by stimuli embedded in a sequence of contextual stimuli with an opposite valence. Increased Late Positive Potentials (LPPs) of extreme political attitudes were observed. Moreover, this LPP enhancement was larger among anarchists than among moderates, indicating that an extreme political attitude of a moderate differs from an extreme political attitude of an anarchist. The discussion elaborates on the meaning of attitude extremity for moderates and extremists.

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Examining Political Attitudes and Ideology through Event-Related Brain Potentials

Since the early days of the study of political psychology, the study of extremism has generated a vast amount of interest. The widespread attention on this fascinating phenomenon can be inferred from various key studies conducted over the years (e.g., Adorno et al., 1950; Altemeyer, 1998; Duckitt, 2001; Eysenck, 1954; Rokeach, 1960). Scholars generally agree that moderates and extremists show large differences with respect to the way they perceive and construe politics (e.g., Liu & Latané, 1998). However, although political psychologists have developed theories of ideology with extremists (e.g., fascists or communists) in mind, they have typically applied these ideas to samples consisting of moderates (Stone & Smith, 1993; for some notable exceptions, Eysenck, 1954; Rocatto & Ricolfi, 2005; Steiner & Fahrenberg, 2000).

The question arising here, however, is whether it is possible to extrapolate findings done among moderates to 'true' extremists. Indeed, both moderates and extremists may report to hold an extreme attitude toward specific political issues, resulting in an equally extreme subjective attitude rating (e.g., they might indicate an extremely negative attitude toward the stimulus 'Hitler'). However, is the intensity of this extreme political attitude the same for moderates as for extremists? Or, alternatively, does the intensity of this attitude differ objectively despite the equally extreme subjective ratings. The present study addressed this question and investigated whether extreme political attitudes would elicit different responses measured by an objective measure of attitude intensity in a sample of political moderates and political extremists.¹

¹ By using the terms 'objective' versus 'subjective', we do not want to imply that self-reports are less valid than, for instance, ERP-data. Instead, they represent two different types of information, both of

The extremist group included in the present study was a sample of anarchists. Anarchism has most commonly been described as a moral doctrine encompassing egalitarianism and personal freedom as its core values (Curran, 2007; Epstein, 2001; Esenwein, 2004; Kinna, 2005) and rejects all forms of hierarchical structures and authority (e.g., governments, police, and corporations). The methods of anarchist protests include symbolic, pacifistic actions, but also actions of civil disobedience and ‘direct’ actions of sabotage and destruction of property. In accordance with the description of anarchism as an ideology, anarchists obtain high scores on the aggression facet scale of Left-Wing Authoritarianism (LWA) and low scores on the submission facet (Van Hiel et al., 2006). Furthermore, anarchism represents an interesting ideology to study, not only because mainstream media and politicians often portray it as the most radical part of contemporary left-wing activism in Western society, but also because anarchists have a highly dissimilar representation of important political psychological variables (e.g., ethnic prejudice, personal values) compared to moderates and communists (Van Hiel, in press).

The political brain

A growing interest in the study of ‘the political brain’ over the past few years can be noted (Amodio et al., 2007; Kaplan et al., 2007; Knutson et al., 2006; Westen et al., 2006; Zamboni et al., 2009). Kaplan et al. (2007), for example, reported an increase in brain activity in the anterior cingulate cortex (ACC) and the dorsolateral prefrontal cortex (PFC) when an opposing candidate was presented (i.e., as opposed to one’s own candidate). This result suggests that people regulate their emotional reactions to opposing candidates by activating cognitive control networks.

A recent neuroimaging study is especially informative for the neural basis of ideology in general and extreme ideology in particular. Zamboni et al. (2009) identified

which have their limitations and methodological problems. It should, however, be stressed that both types of information can be used as sources of cross-validation.

the dimensions of individualism, conservatism, and radicalism as important bases underlying political beliefs, revealing that these dimensions are related to the activation of specific brain areas. Most important for the present study, the dimension of radicalism versus moderatism is positively related to activation in the posterior cingulate, which has also been reported to be involved in emotional salience processing (Maddock et al., 2003).

However, the majority of these previous studies have included non-partisans (Amodio et al., 2007; Knutson et al., 2006, 2008; Zamboni et al., 2009) or only members of mainstream parties (Kaplan et al., 2007; Westen et al., 2006). Hence, whether extreme political attitudes among moderates and extremists would elicit different brain patterns in response to political stimuli is yet untested.

The suggestion here is that such differences can certainly be expected because extreme attitudes elicit processes connected to affectively laden stimuli, while others have asserted (e.g., Liu & Latané, 1998) that extremists ascribe high importance and personal relevance to their political attitudes, which they hold with great intensity and vigor. Therefore, we argue that an extreme political attitude of a moderate is differently represented compared to an extreme political attitude of an extremist. In other words, because of variations in terms of relevance, specific political stimuli (e.g. ‘Disarmament’ and ‘Hitler’) are likely to be differently represented in moderates and members of extremist groups such as anarchists.

Likert-scales, however, fail to capture these differences because of their subjective nature. Indeed, Biernat and her colleagues (Biernat, 2003; Biernat & Manis, 1994; Biernat, et al., 1991) have argued that the use of Likert- scales allows respondents to personally define and adjust rating categories. For instance, Biernat and Manis (1994) have demonstrated that the meaning of the label ‘very aggressive’ shifts depending on

whether a male or a female is being evaluated. In particular, they found that to judge a male as very aggressive, he must meet a higher standard for aggressiveness, displaying objectively extreme aggressive behavior. Females, however, are often subjectively labeled as very aggressive even when they objectively display moderate levels of aggression. In other words, Biernat and her colleagues have convincingly demonstrated that the use of subjective response scales may not always be appropriate to investigate mental representations of stimuli.

In the present research, we argue that when moderates and extremists provide an equally extreme rating on a Likert scale for a specific political attitude, they may not necessarily share a similar representation of this particular attitude. Indeed, the broader ideological background or the extremity of the ideological group to which respondents belong may shift the meaning or interpretation of the scale labels. In particular, although moderates may consistently indicate the scale ends to report an extremely positive or negative attitude, this attitude is only extreme in relative terms, i.e. compared to their attitudes toward other political issues or to the attitudes of other moderates. However, the attitudes represented by these ‘extreme’ scores reported by moderates are still fairly ‘moderate’ compared to extremely positive or negative attitudes of extremists. To demonstrate the differential meaning of extreme attitudes between moderates and extremists, we need to use response scales that are externally anchored (Biernat, 2003), or in other words, objective measures which are less susceptible to shifts in meaning across contexts or respondents.

Attitudes and the oddball paradigm

As an objective measure of attitude extremity, the present study used the oddball paradigm, a paradigm that has been frequently applied in previous ERP studies (e.g., Cacioppo et al., 1993; Cacioppo et al., 1994; Crites et al., 1995; Ito & Cacioppo, 2000;

Ito et al., 1998). In the oddball paradigm, infrequently presented stimuli of one category are shown interspersed among frequently presented stimuli of another category, resulting in an enhanced positive component in the ERP waveform at roughly 300 ms after presentation of the rare stimulus (e.g., Donchin, 1981; Donchin, & Coles, 1988), called the P300 component. To date, a number of studies have identified a similar enhancement of Late Positive Potentials (LPPs), typically occurring in the interval starting at 300-400 ms and ending at 900 ms (Cacioppo et al., 1993; Cacioppo et al., 1994; Crites et al., 1995; Ito & Cacioppo, 2000; Ito et al., 1998). The enhancement of the LPPs has been typically ascribed to a person's sensitivity to evaluative changes. In particular, a number of studies identified an enhancement of the LPPs when a single stimulus of one valence category (e.g., a positive 'target' stimulus) was presented interspersed in a short sequence of stimuli of another valence category (e.g., negative 'context' stimuli), relative to a target that has a similar valence as the context (e.g., a negative target within a negative context). This difference in LPP amplitude between evaluative inconsistent and evaluative consistent target stimuli is referred to as the evaluative inconsistency effect.

Important for the present purposes, it has also been shown that the LPPs in the oddball paradigm are modulated by motivational relevance. For example, Schupp et al. (2000) reported greater inconsistency effects for pictures depicting threat, violent, death, and erotica, which are assumed to strongly activate motivational processes. Along similar lines, Schupp et al. (2004) reported greater LPPs for affective pictures of high arousal than for less affectively intense pictures.

The present study

Applying a modified oddball paradigm, we presented extremely positive and negative stimuli as targets within a positive or negative context. In addition to their

evaluative dimension (positive or negative), stimuli also varied along a non-evaluative dimension as to whether they were political or non-political. This design enabled us to compare the LPPs elicited by consistent and inconsistent targets with political and non-political stimuli.

The main aim was to examine whether different ideologies generate distinct patterns of LPPs in response to the presentation of political stimuli which have been subjectively rated as equally extreme across respondents. Combining the neuroimaging studies (i.e., Zamboni et al., 2009) with the LPP studies (i.e., Schupp et al., 2000; Schupp et al., 2004), we hypothesized a greater LPP-inconsistency effect with political stimuli among anarchists than among moderates because the former hold political attitudes with greater emotion and intensity.

Method

Participants

Twenty-six volunteers (13 males and 13 females with a mean age of 24.23 years, $SD = 4.46$) participated in this experiment for a monetary compensation of 30 euro. They signed informed consent and had normal or corrected-to-normal vision. The anarchist group ($N = 13$) was approached by visiting several residences (including squatted buildings and official addresses), while the group of moderates ($N = 13$) were undergraduate students. Data of one participant from the moderate group and two participants from the anarchist group were excluded from the analyses because of excessive artifact in the electroencephalogram (EEG) due to head movement ($N = 1$) or problems with data acquisition ($N = 2$).

Stimulus materials

Four categories of stimulus-words were used which varied along an evaluative (positive and negative) and a non-evaluative (political and non-political) dimension. As

non-political stimuli, we selected 10 extremely positive (e.g., ‘surprise’ and ‘rainbow’) and 10 extremely negative (e.g., ‘slaughter’ and ‘misery’) words from two lists of Dutch normative studies (Hermans & De Houwer, 1994; Van Der Goten et al., 1999).

Individual sets of political stimuli were composed for each participant prior to the experiment. At least three days before the start of the experiment, participants evaluated a list of political words (including political issues and names of politicians) on 7-point scales ranging from extremely negative (-3), neutral or unknown (0), to extremely positive (+3) (see Crites & Cacioppo, 1996). Because we were only interested in the extremely evaluated words, we selected 10 positive and 10 negative words which were rated as +3 or -3, respectively, for each participant.

Across all participants, a total of 66 different political stimuli were selected. Although stimuli were selected ideographically, there was considerable overlap in the stimuli selected by participants of both groups. Indeed, whereas it was theoretically possible that a stimulus was selected by 13 participants more in one group compared to the other group (i.e., the 13 anarchists selected a particular stimulus, while not one single moderate selected it, and vice versa), the average group difference of the frequency that a stimulus was selected amounted to a modest 2.06. Moreover, taking a cut-off value of 5, it was revealed that only six stimuli (i.e., less than 10% of the entire stimulus set) were selected far more frequently by one of the ideological groups (i.e., less than 10% of stimuli were selected by at least 5 participants more in one group than in the other group). Examples of political words frequently rated as extremely negative in both ideological groups were ‘fascist’ and ‘extreme-right’, whereas popular extremely positive words were ‘ecology’ and ‘equality’.

Procedure and design

The procedure closely followed prior ERP research on evaluative categorization (see Cacioppo et al., 1993; Cacioppo et al., 1994; Crites et al., 1995; Ito & Cacioppo, 2000; Ito et al., 1998). After electrode application, participants were seated in a sound-attenuating, electrically shielded room. They were instructed to focus their attention on the words, which were presented one by one in the middle of the screen. To ensure that they attended the evaluative dimension of the words, they were asked to indicate whether they found it positive or negative by pressing the appropriate button on a response pad after the offset of each word. Because the responses are given after the offset of the stimuli, the reaction time latencies are irrelevant in this experiment.

Sequences of 6 stimuli were created so that each sequence counted 1 target within a context of 5 context stimuli. The combination of all stimulus categories resulted in 16 sequence types. Sequence types differed along (a) the evaluative dimension (positive versus negative words) of the context stimuli; (b) the non-evaluative dimension (non-political versus political words) of the context stimuli; (c) the evaluative dimension of the target; and (d) the non-evaluative dimension of the target. As such, 16 different target types were created. More specifically, besides being political or non-political and positive or negative, targets were also either evaluative consistent or inconsistent and either non-evaluative consistent or inconsistent with the context. To decrease the predictability of the presentation of the inconsistent targets, all targets appeared randomly in either the third, fourth, or fifth position in a sequence.

Four separated blocks grouped the sequences in such a way that the context words within each block were derived from one stimulus category (e.g., Ito & Cacioppo, 2000), resulting in four different sequence types within each block. The order of the blocks was counterbalanced across participants. Sequences were repeated 12

times, resulting in 48 randomly distributed sequences of 6 words per block. As such, each of the 16 target types were presented 12 times. Because the valence of the targets was not of special interest to the present study, the design counted 24 trials per relevant condition to test the present hypotheses.

Furthermore, each specific word was presented 24 times as context word within its corresponding block and was presented at least once (and maximum twice) as target within each block. Stimuli were presented on the screen for 1000 ms, followed by a 1900 ms interstimulus interval. Within each block, all sequences followed each other with an extra 1100 ms after the last stimulus, resulting in a 3000 ms interval between two successive sequences. Participants were informed that there were incidences in which more time was given between two words, which participants could use as a moment to blink. Between each block, the word “pause” appeared on the screen and participants were able to decide when to start the next block.

Psychophysiological data collection and reduction

The EEG data was recorded at 31 scalp sites using Ag/AgCl electrodes attached to an elastic cap, according to an expanded version of the International 10-20 system. These electrodes were referenced on-line to the average of all electrodes and re-referenced off-line to a computed average of the left and right mastoid. Vertical eye movements and blinks were recorded from bipolar electrodes placed above and below the left eye; bipolar electrodes placed on the outer canthi of both eyes monitored horizontal eye movements. Electrode impedances were kept below 5 k Ω . The EEG and the electrooculogram (EOG) were amplified and digitized at 512 Hz and off-line bandpass filtered from 0.1 to 10 Hz.

Average waveforms were computed for all targets of each sequence type, in a time-window from 200 ms before to 1100 ms after stimulus onset, for each participant.

All trials followed by an incorrect response or without response and all epochs containing muscle artifacts or electrode drifting were rejected prior to averaging. The amplitude registered 200 ms preceding the stimulus onset served as the baseline. All epochs containing blinks were corrected by a subtraction of blink propagation factors, based on PCA-transformed EOG components (Nowagk & Pfeifer, 1996). Next, based on prior research (e.g., Crites et al., 1995; Ito & Cacioppo, 2000; Ito et al., 1998) and after visual inspection of the data, a window from 400 to 900 ms after stimulus onset was chosen to further investigate the LPPs. To quantify the LPPs, we computed the mean amplitude along the chosen area for each waveform.

Ideological variables

In order to check their ideological group, participants completed some ideological scales two weeks before they participated in the main experiment. These questionnaires were rated on 5-point scales anchored by ‘*Certainly disagree*’ (1) and ‘*Certainly agree*’ (5). Participants completed a newly developed 20-item anarchism questionnaire (Cronbach’s $\alpha = .94$), which consists of items drawn from statements of the founding fathers of anarchism (i.e., William Godwin, Max Stirner, Pierre-Joseph Proudhon, and Mikhail Bakunin). Sample items include, “Freedom can only be realized if the state is being destroyed completely”, “All laws created by humans are arbitrary, leading to oppression”, and “Imprisonment does not help to change people”. They also completed an 8-item LWA scale (Van Hiel, et al., 2006), consisting of an aggression (Cronbach’s $\alpha = .89$) and a submission facet scale (Cronbach’s $\alpha = .72$).

Results

Verification of ideological group

In order to validate the assumption that two ideologically different groups participated in this study, we compared the ideology scores of the moderate and

anarchist group. In line with our expectations, the radical group scored significantly higher on the anarchism scale than the control group, $M = 3.49$ and $M = 2.50$, respectively, $F(1,21) = 12.80$, $p < .005$. Moreover, the LWA-profile of moderates and radicals mirrored the results obtained by Van Hiel et al. (2006); anarchists obtained higher scores on the aggression facet scale, $M = 3.50$ and $M = 2.05$, for the anarchists and moderates, respectively, $F(1,21) = 29.64$, $p < .001$, whereas they obtained a significantly lower score on the submission facet scale, $M = 1.48$ and $M = 2.16$, for the anarchists and moderates, respectively, $F(1,21) = 6.32$, $p < .05$.

Analysis of LPP patterns

Figures 1a and 1b depict the scalp activation for the time window of 400-900ms averaged over the inconsistent and consistent trials. In accordance with previous research (Caccioppo et al., 1994; Crites et al., 1995; Ito & Cacioppo, 2000; Ito et al., 1998) and as can be seen in Figure 1, the largest LPPs and experimental effects were situated at the Pz site. Hence, for the sake of clarity and ease of presentation, only the analyses on the Pz electrode data are reported here.

Insert Figure 1 about here

The inconsistency effect and ideological group

Mean LPP amplitude was subjected to a 2 (Word Category: political/non-political) x 2 (Valence: positive/negative) x 2 (Evaluative Consistency: consistent/inconsistent) x 2 (Non-evaluative Consistency: consistent/inconsistent) x 2 (Ideology: radical/moderate) multivariate ANOVA. The first four factors of this design were manipulated within subjects, whereas Ideology was a between-subjects factor.

We obtained a main effect of Evaluative Consistency, $F(1, 21) = 85.22$, $p < .001$. Figure 2, which depicts the grand average ERP waveforms at Pz, shows that inconsistent targets, $M = 5.74\mu V$, elicited larger LPPs than consistent targets, $M =$

2.63 μ V. More specifically, in line with previous research (Cacioppo et al., 1993; Cacioppo et al., 1994; Crites et al., 1995; Ito & Cacioppo, 2000; Ito et al., 1998), inconsistent non-political targets, $M = 5.42\mu$ V, elicited larger LPPs than non-political consistent targets, $M = 1.82\mu$ V, $F(1, 21) = 81.16$, $p < .001$. Moreover, an inconsistency effect was obtained for the political targets as well, $F(1, 21) = 47.26$, $p < .001$, $M = 6.06\mu$ V and $M = 3.42\mu$ V, for the inconsistent and consistent political targets, respectively.

Insert Figure 2 about here

Furthermore, in line with our expectations, we obtained a significant Word Category x Evaluative Consistency x Ideology interaction effect, $F(1,21) = 12.04$, $p < .005$.² Table 1 presents the mean LPP amplitudes for the two groups as a function of word category and evaluative consistency. In order to illuminate the exact nature of this effect, planned contrasts revealed, in line with our hypothesis, a significant greater inconsistency effect with political targets for the anarchist group, $M = 3.44\mu$ V, than for the moderate group, $M = 1.83\mu$ V, $F(1, 21) = 4.42$, $p < .05$ (see Figure 3). With the non-political targets, no significant difference in evaluative inconsistency effect between the groups was obtained, $F(1, 21) = 2.03$, ns ($M = 3.03\mu$ V and $M = 4.17\mu$ V, for the anarchist and moderate group, respectively).

Insert Table 1 about here

Insert Figure 3 about here

² This analysis also resulted in some significant effects of minor relevance. Main effects of Word Category, $F(1,21) = 31.25$, $p < .001$, and Non-evaluative Consistency, $F(1, 21) = 7.55$, $p < .05$ were obtained, indicating that political targets ($M = 4.74\mu$ V) yielded larger LPPs than non-political targets ($M = 3.62\mu$ V) and non-evaluative inconsistent targets ($M = 4.65\mu$ V) yielded larger LPPs than non-evaluative consistent targets ($M = 3.71\mu$ V). These results largely mirror previous research that showed a greater sensitivity in favor of some stimulus categories as well as a similar non-evaluative inconsistency effect (see, Ito & Cacioppo, 2000). Finally, we obtained a Word Category x Evaluative Consistency interaction, $F(1,21) = 5.91$, $p < .05$, indicating a greater evaluative inconsistency effect for non-political targets ($M = 3.60\mu$ V) than for political targets ($M = 2.64\mu$ V) and a Word Category x Valence interaction, $F(1,21) = 5.77$, $p < .05$, revealing that the effect of Word Category was especially pronounced for the positive compared to the negative targets (a Word Category effect of $M = .45\mu$ V and $M = 1.80\mu$ V, respectively).

Discussion

The present study addressed the question whether ideological extremity results in distinctive LPP patterns for political attitudes which were subjectively rated as equally extreme by ideological moderates and extremists. In particular, we investigated whether anarchists show a greater inconsistency effect for extreme political attitudes than moderates. In line with our hypothesis, the present results showed a larger inconsistency effect with political stimuli, but not with non-political stimuli, for the anarchists than for the moderates.

We further validated our a-priori classification of moderates and anarchists by using self-report measures of ideology. In particular, the scores on a newly developed anarchism scale revealed higher scores among those who were classified as anarchists than among those classified as moderates. Moreover, we obtained the highly distinctive pattern of high LWA aggression and low LWA submission scores that is typical for anarchists (see, Van Hiel et al., 2006).

Attitudinal and ideological extremity

The present study expands previous research that has interpreted the LPP effect as a measure of attitude extremity (e.g., Cacioppo et al., 1994) to the more general level of ideological extremity. Indeed, the political stimuli in our study were selected on the basis of their subjective extremity on self-report scales (see also Crites & Cacioppo, 1996) for both ideological groups. As such, we assured that the obtained group differences did not emerge simply because of differences in subjective extremity. Our ERP-results thus attest of a ‘double extremity’ effect of ideology (in the sense that the effect of attitude extremity intensifies when having an extreme ideology).

The greater inconsistency effect among anarchists extends recent neuroimaging studies showing that extreme as opposed to moderate attitudes involve patterns of

activation of brain areas that are typically involved in the processing of emotionally laden stimuli (Zamboni et al., 2009). Hence, the greater inconsistency effect among extremists indicates that extremists hold these attitudes with greater intensity. In line with this, recent studies that used the oddball paradigm have explicitly shown that LPPs are indeed modulated by motivational relevance rather than by sheer extremity (Schupp et al., 2000; Schupp et al., 2004).

The present results also suggest that anarchists and moderates do not share a similar mental representation of political attitudes. As we know from Biernat's work (Biernat, 2003; Biernat & Manis, 1994; Biernat, et al. 1991), our main finding can be interpreted in terms of shifting standards. That is, the meaning of self-report scales shifts depending on respondents' interpretation of the scale as well as the category of stimuli being judged. In other words, despite the use of identical response scales, different evaluation standards may be applied across respondents and target stimuli. Thus, the discrepancy between the subjective and objective measures in the present research suggests that anarchists and moderates use different standards of judgment when they evaluate political stimuli on self-report scales.

Implications for political psychological theories of extremism

Although many classic political psychological theories like authoritarianism theory (Adorno et al., 1950) as well as more recent theories like the Catastrophe Model of attitudes (Liu & Latané, 1998) and Context Theory (e.g., Sidanius, 1988) were developed with 'true' extremists in mind, scholars have typically applied these theories to the study of ideology in moderate samples. Surprisingly, hardly any data have been collected on true extremists (see, Stone & Smith, 1993; Van Hiel, in press). However, Van Hiel (in press) recently cautioned against extrapolating results obtained in moderate samples to extremists. Indeed, this author reported marked differences between

ideological groups (i.e., moderates, anarchists, communists, and right-wing extremists) in terms of both the psychometric properties of important political psychological variables such as social attitudes (i.e., Right-Wing Authoritarianism and Social Dominance Orientation), personal values, and prejudice, as well as the pattern of correlations among these measures. Hence, these results indicated differences between various ideologies in the interpretation and nomological network of these variables.

There is a remarkable consistency between the present study and Van Hiel (in press) since both studies seem to indicate that moderates and extremists differently represent and process politically relevant variables. Indeed, on the one hand, the present results indicate that an equal (subjective) rating does not imply an equal (objective) experience. Van Hiel (in press), on the other hand, has shown that the meaning of political psychological concepts may differ between moderates and extremists. The implication of these findings is that because scales may have a different meaning in moderate and extreme groups, subjective ratings on these scales cannot be compared in a straightforward manner (see Van Hiel, Figure 1). Of course, one should be cautious to compare the present study and Van Hiel (in press) given the methodological differences. In particular, the present study used neuropsychological techniques which were applied on focal attitudes about particular political stimuli, whereas Van Hiel (in press) used self-report scales that probed into broad political psychological constructs.

Having established the distinctiveness of moderates and extremists, future research is needed to specify the psychological processes underlying attitude radicalization among extremists. As we have previously argued, the difference between moderates and extremists may reside in the importance and personal relevance of the attitude under study (Liu & Latané, 1998). According to Liu and Latané (1998), the tendency to become more extreme may be caused by spending more time thinking about

an issue (e.g., Millar & Tesser, 1986), having more information available (e.g., Sidanius 1988; Van Hiel & Mervielde, 2003), or being exposed to group members, leading to group polarization (e.g., Isenberg, 1986). Through the operation of these processes, involvement in an extremist group may drive the radicalization process of attitudes to the highest levels.

Limitations and strengths

To the best of our knowledge, we are the first to apply neuropsychological methods to true extremists. A definite innovative feature of the present study is that we were able to obtain these greater inconsistency effects in a sample of politically active anarchists. Anarchism is an even less studied ideology than fascism and communism and it is clear that the anarchists investigated in the present study should be classified as adherents of a rather small “exotic” movement (see also Van Hiel et al., 2006).

However, the anarchist movement is still very active in many fields of protest (e.g., anti-globalization, environmentalism, anti-fascism, and animal rights) and constitutes an important part of left-wing activism. As is the case with most extremist groups, their opinions and actions do not always elicit much support in the mass public and among activists of established political parties. Nevertheless, the study of extremism in itself also represents an interesting avenue for research since problematic behaviors such as terrorism (Post, 2005) and genocide (Staub, 1996) often have roots within branches of extremism with less noble goals.

An important limitation of the present study is the small sample size. One could argue that the present findings may capitalize on error variance. However, our results generally corroborated the hypotheses and the magnitude of the effects was fairly high, attesting to the validity of the present findings. Moreover, the number of participants in

the present study was not especially low in comparison with the few previous studies that included a sample of extremists as well as compared to most other ERP studies.

Another limitation is the use of only one extreme ideology. The question arising here is whether similar results would be obtained with other extreme ideologies. For example, do political attitudes elicit greater LPPs among fascists, communists, or other extremist groups like religious fanatics? Future studies might consider to test extremists of various stances.

Finally, it should be acknowledged that the use of ERP is not a very fine-toothed instrument. Indeed, whereas ERP-research is a time-consuming method to measure one single construct in a relatively small sample, the use of self-report measures makes it possible to efficiently assess a multitude of constructs among large samples. Having said this, we were able to demonstrate that objective measures, which are less susceptible to shifts in meaning, allow researchers to judge the value of subjective ratings. Furthermore, the use of ERP does not allow the exact localization of the involved brain regions. Neuroimaging studies using Functional Magnetic Resonance Imaging (fMRI) provides a more reliable location of the involved brain areas. Such studies allow to test whether ‘emotional’ brain regions like the posterior cingulate (see Zamboni et al., 2009) and the left insula (see Knutson et al., 2008) are recruited when extremists process political attitudes.

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Table 1

Mean LPP amplitude (in μV) for the two groups (moderate versus anarchist) as a function of Word Category and Evaluative Consistency

		Word Category	
	Evaluative consistency	Political	Non-Political
Anarchists	Consistent	2.92 (.76)	1.85 (.70)
	Inconsistent	6.36 (.87)	4.88 (.86)
Moderates	Consistent	3.93 (.73)	1.79 (.67)
	Inconsistent	5.76 (.84)	5.96 (.82)

Note. Mean area amplitude on the Pz electrode for the time window of 400 to 900ms

Figure Captions

Figure 1. Topographic map of the scalp activation for the time window of 400-900ms averaged over a) inconsistent trials and b) consistent trials.

Figure 2. Grand average ERP waveforms at Pz for the evaluative consistent and inconsistent condition.

Figure 3. The evaluative inconsistency effect (in μV , for the time window of 400-900ms) for the two ideological groups as a function of Word Category

Figure 1

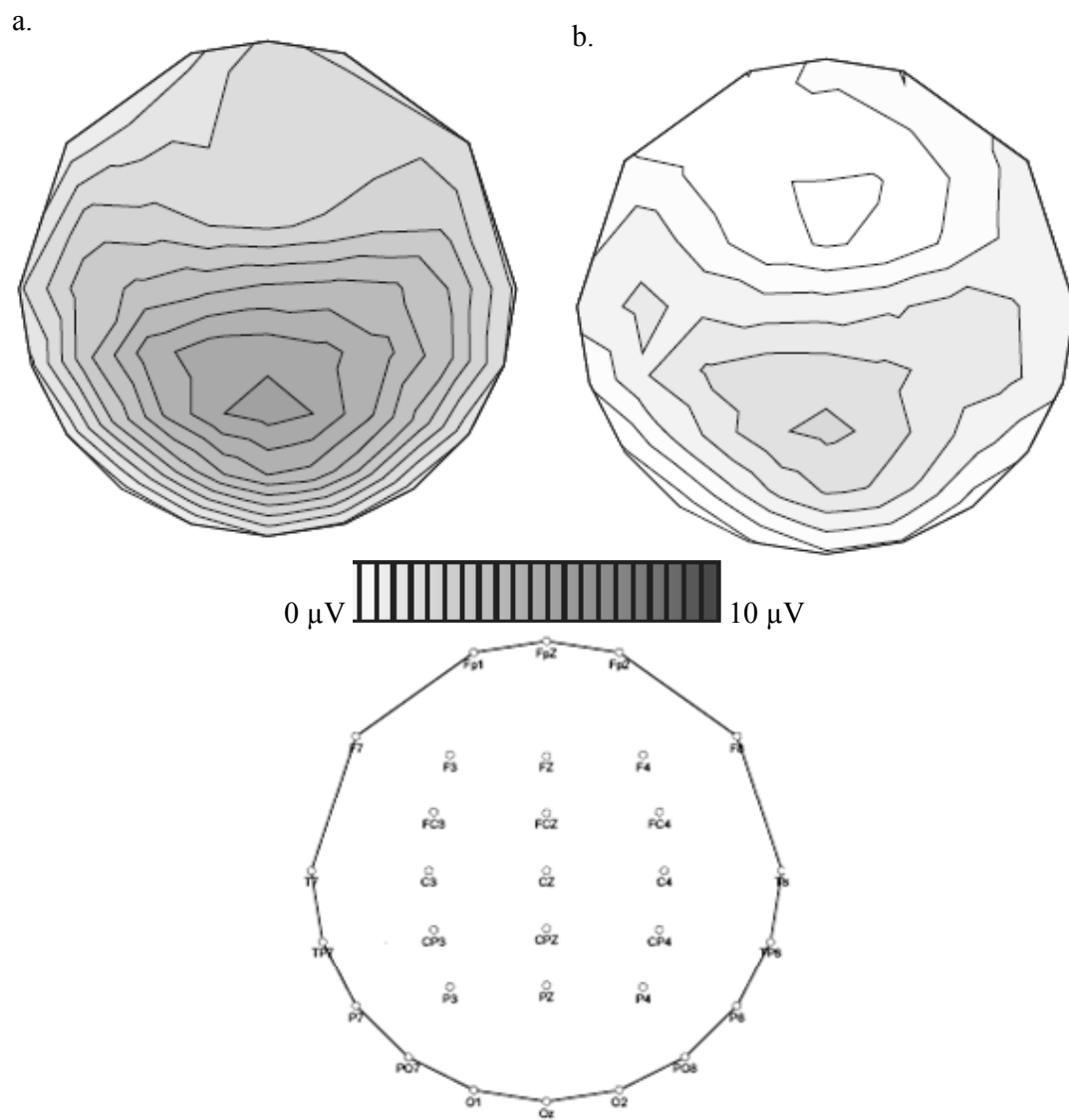


Figure 2

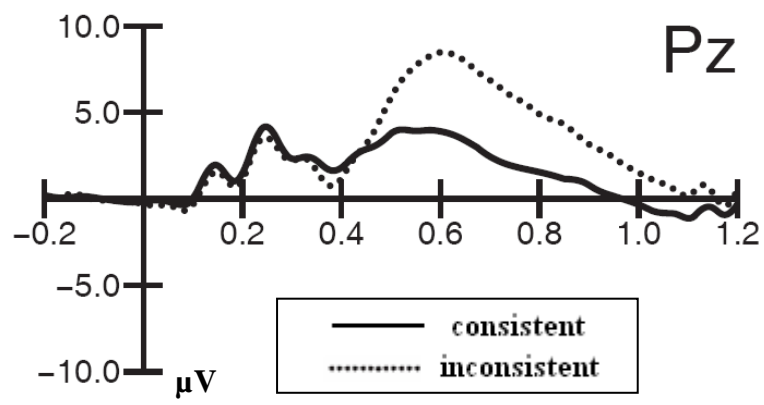


Figure 3

